

What is claimed is:

1           1.     A catheter system comprising:  
2                 a deflection region having a longitudinal axis and a length, the deflection  
3 region having a wall, the wall having at least two sections, each section having a  
4 specific density which is different from each other section, the wall sections  
5 configured to define a predefined deflection pattern when a force is applied to the  
6 deflection region.

1           2.     The catheter system of claim 1, further comprising:  
2                 at least one longitudinal element provided within the wall of the  
3 deflection region, the longitudinal element being substantially axially aligned with the  
4 longitudinal axis of the deflection region and providing a directional bias to the  
5 deflection region.

1           3.     The catheter system of claim 2, wherein the longitudinal element is  
2 made from a shape memory material.

1           4.     The catheter system of claim 2, wherein the longitudinal element is a  
2 wire.

1           5.     The catheter system of claim 2, wherein the longitudinal element is a flat  
2 shim.

1           6.     The catheter system of claim 1, further comprising an actuator member  
2 provided to apply an actuation force to the deflection region.

1           7.     The catheter system of claim 1, further comprising a rib along the wall.

- 1 8. The catheter system of claim 7, wherein the longitudinal member is  
2 provided within the rib.
- 1 9. The catheter system of claim 1, further comprising a body region having  
2 a body wall, the body region being attached to the deflection region.
- 1 10. The catheter system of claim 9, wherein the body wall defines a lumen  
2 and a conduit is provided within the lumen.
- 1 11. The catheter system of claim 10, wherein the conduit is located in the  
2 center of the lumen.
- 1 12. The catheter system of claim 11, further comprising a torqueable  
2 member provided within the lumen.
- 1 13. The catheter system of claim 12, wherein the torqueable member is  
2 located adjacent the conduit.
- 1 14. The catheter system of claim 12, wherein the torqueable member is  
2 located adjacent the body wall.
- 1 15. The catheter system of claim 10, further comprising a plurality of vanes  
2 adjacent the torqueable member.
- 1 16. The catheter system of claim 1, further comprising a distal region.
- 1 17. The catheter system of claim 16, wherein the distal region includes a  
2 treatment tip.

- 1 18. The catheter system of claim 1, further comprising a non-compressible  
2 element.
- 1 19. The catheter system of claim 9, further comprising a non-compressible  
2 element.
- 1 20. The catheter system of claim 18, wherein the non-compressible element  
2 is provided adjacent the wall.
- 1 21. The catheter system of claim 18, wherein the non-compressible element  
2 is provided within the wall.
- 1 22. The catheter system of claim 19, wherein the non-compressible element  
2 is provided adjacent the body wall.
- 1 23. The catheter system of claim 19, wherein the non-compressible element  
2 is provided within the body wall.
- 1 24. The catheter system of claim 19, wherein the non-compressible element  
2 is provided adjacent the wall and the body wall.
- 1 25. The catheter system of claim 19, wherein the non-compressible element  
2 is provided within the wall and the body wall.
- 1 26. The catheter system of claim 18, wherein the non-compressible element  
2 is a braided sleeve.
- 1 27. The catheter system of claim 18, wherein the non-compressible element  
2 is a coil.

1           28. A catheter system comprising:

2                   a deflection region having a longitudinal axis and a length, the deflection  
3 region having a wall, the wall having at least two sections, each section having a  
4 specific density which is different from each other section,  
5                   at least one longitudinal element disposed within the wall of the  
6 deflection region, the longitudinal element being substantially axially aligned with the  
7 longitudinal axis of the deflection region and providing a directional bias to the  
8 deflection region, the different wall sections and the longitudinal element being  
9 configured to define a predefined deflection pattern when a force is applied to the  
10 deflection region.

1           29. A catheter system comprising:

2                   at least two longitudinal elements disposed within a wall of a deflection  
3 region, the wall having a longitudinal axis and the longitudinal elements being  
4 substantially axially aligned with the longitudinal axis of the deflection region;

5                   at least two actuator members, the actuator members being configured to  
6 apply respective actuation forces to the deflection region, the deflection forces being  
7 substantially aligned with the longitudinal axis of the deflection region;

8                   wherein the longitudinal members and the actuation members are  
9 arranged radially around the wall of the deflection region relative to one another in a  
10 configuration to define a deflection plane and shape of the deflection region.

1           30. The catheter system of claim 29, wherein the longitudinal members and  
2 the actuation members are aligned at ninety degree increments around the wall of the  
3 deflection region.

1           31.    A catheter system comprising:  
2                   a body region having a body wall, the body region defining a lumen;  
3                   a conduit disposed within the lumen; and  
4                   a torqueable member provided within the lumen, the torqueable member  
5 being configured to transmit rotational forces along the catheter system.

1           32.    The catheter system of claim 31, wherein the torqueable member is  
2 provided adjacent the conduit.

1           33.    The catheter system of claim 31, wherein the lumen has an outer  
2 periphery and the torqueable member is provided adjacent the periphery of the lumen.

1           34.    The catheter system of claim 31, further comprising a plurality of vanes  
2 adjacent the torqueable member and the conduit, the vanes being configured to support  
3 the conduit within the catheter system.

1           35.    The catheter system of claim 31, wherein the torqueable member is a  
2 braided sleeve.

1           36.    The catheter system of claim 31, wherein the torqueable member is a  
2 coil.

1           37.    The catheter system of claim 31, further comprising a non-compressible  
2 element

1           38.    The catheter system of claim 37, wherein the non-compressible element  
2 is provided adjacent the wall.

1            39.    The catheter system of claim 37, wherein the non-compressible element  
2    is provided within the wall.

1            40.    The catheter system of claim 37, wherein the non-compressible element  
2    is a braided sleeve.

1            41.    The catheter system of claim 37, wherein the non-compressible element  
2    is a coil.

1            42.    The catheter system of claim 31, further comprising a distal region  
2    attached to the deflection region, the distal region including a treatment tip and being  
3    configured to affect a tissue to be treated.

1            43.    A method of forming a catheter system, comprising the steps of:  
2    providing at least one longitudinal member;  
3    forming a body with a predefined density around the longitudinal  
4    element.

1           44. A catheter system comprising:  
2           a deflection region having a longitudinal axis and a length, the deflection  
3 region having a wall, the wall having at least two sections, each section having a  
4 specific density which is different from each other section, the different wall sections  
5 being configured to define a predefined deflection pattern when a force is applied to  
6 the deflection region;  
7           at least one longitudinal element disposed within the wall of the  
8 deflection region, the longitudinal element being substantially axially aligned with the  
9 longitudinal axis of the deflection region and providing a directional bias to the  
10 deflection region;  
11           an actuator member, the actuator member being configured to apply the  
12 force;  
13           a body region having a body wall, the body region being attached to the  
14 deflection region and the body wall defining a lumen having a conduit disposed  
15 therein;  
16           a torqueable member provided within the lumen, the torqueable member  
17 being located adjacent the conduit and configured to transmit rotational forces along  
18 the catheter system;  
19           a plurality of vanes adjacent the torqueable member, the vanes being  
20 configured to support the conduit within the catheter system;  
21           a distal region attached to the deflection region, the distal region  
22 including a treatment tip and being configured to affect a tissue to be treated.